THE ASTROPHYSICAL JOURNAL

Supplement Series

PUBLISHED BY THE UNIVERSITY OF CHICAGO PRESS FOR
THE AMERICAN ASTRONOMICAL SOCIETY

HELMUT A. ABT, *Managing Editor*
Kitt Peak National Observatory

STEPHEN E. STROM, *Associate Managing Editor*
Kitt Peak National Observatory

AAS PUBLICATIONS BOARD

WILLIAM L. KRAUSHAAR (1979–80) *Chairperson 1979–80*
University of Wisconsin

SUMNER STARRFIELD (1979–81)
Arizona State University

WILLIAM F. VAN ALTENA (1979–80)
Yale University Observatory

SIDNEY C. WOLFF (1979–80)
University of Hawaii, Institute of Astronomy

MORTON S. ROBERTS (1979)
National Radio Astronomy Observatory

ROBERT P. KRAFT (1979)
Lick Observatory

Production: ELMARS BILSENS

Manuscript Editor: THERESA J. SLOWIK

★ ★ ★

VOLUME 42

1980 JANUARY, FEBRUARY, MARCH, AND APRIL

PUBLISHED BY THE UNIVERSITY OF CHICAGO PRESS FOR
THE AMERICAN ASTRONOMICAL SOCIETY

© 1980 BY THE AMERICAN ASTRONOMICAL SOCIETY. ALL RIGHTS RESERVED.
PUBLISHED MONTHLY

COMPOSED BY SCIENCE TYPOGRAPHERS, INC., MEDFORD, NEW YORK, U.S.A.

PRINTED BY THE UNIVERSITY OF CHICAGO PRINTING DEPARTMENT,
CHICAGO, ILLINOIS, U.S.A.

THE ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES
CONTENTS OF VOLUME 42

1980 JANUARY, Number 1

		Page	Fiche
THE LUMINOSITY FUNCTION FOR PLANETARY NEBULAE AND THE NUMBER OF PLANETARY NEBULAE IN LOCAL GROUP GALAXIES	*George H. Jacoby*	1	1-A2
THE GLOBULAR CLUSTER SYSTEM OF THE GALAXY. I. THE METAL ABUNDANCES AND REDDENINGS OF 79 GLOBULAR CLUSTERS FROM INTEGRATED LIGHT MEASUREMENTS	*Robert Zinn*	19	1-E1
THE DISTRIBUTION OF LYMAN-ALPHA ABSORPTION LINES IN THE SPECTRA OF SIX QSOs: EVIDENCE FOR AN INTERGALACTIC ORIGIN	*Wallace L. W. Sargent, Peter J. Young, A. Boksenberg, and David Tytler*	41	1-G2
BRIGHT GALAXIES IN NEARBY ABELL CLUSTERS	*M. P. Haynes*	83	2-D2
COLLISIONAL EXCITATION OF INTERSTELLAR MOLECULES: WATER	*Sheldon Green*	103	2-G1
STATISTICAL SUMMARIES OF POLARIZED PULSAR RADIATION	*D. C. Backer and Joanna M. Rankin*	143	3-F2
THE *COPERNICUS* ULTRAVIOLET SPECTRAL ATLAS OF IOTA HERCULIS	*Walter L. Upson II and John B. Rogerson, Jr.*	175	4-D1

FEBRUARY, Number 2

THE PHYSICAL EFFECTS OF RADIATIVE TRANSFER IN MULTIDIMENSIONAL MEDIA INCLUDING MODELS OF THE SOLAR ATMOSPHERE	*Harrison P. Jones and Andrew Skumanich*	221	6-A2
THE TITANTIUM OXIDE Φ SYSTEM	*Daniel C. Galehouse, James W. Brault, and Sumner P. Davis*	241	6-C1
NONRADIAL *m*-MODE CHANGES IN THE 53 PERSEI VARIABLE 22 ORIONIS	*Myron A. Smith*	261	6-E1
ULTRAVIOLET PHOTOMETRY FROM THE *ORBITING ASTRONOMICAL OBSERVATORY.* XXXVIII. A SECOND ATLAS OF ULTRAVIOLET SPECTRA	*Marilyn R. Meade and A. D. Code*	283	6-G2
DISCOVERY AND SPECTROPHOTOMETRY OF THE QUASARS IN THE −40° ZONE OF THE CTIO CURTIS SCHMIDT SURVEY	*Patrick S. Osmer and Malcolm G. Smith*	333	7-D1
THE EMISSION-LINE SPECTRUM FROM A SLAB OF HYDROGEN AT MODERATE TO HIGH DENSITIES	*Stephen A. Drake and Roger K. Ulrich*	351	7-F1

MARCH, Number 3

THE EQUATION OF STATE NEAR β EQUILIBRIUM FOR A COLLAPSING STELLAR CORE	*Martin J. Murphy*	385	9-A2
THE MAGNETIC FIELDS OF THE Ap STARS	*Ermanno F. Borra and J. D. Landstreet*	421	9-D1
STELLAR WEAK-INTERACTION RATES FOR *sd*-SHELL NUCLEI. I. NUCLEAR MATRIX ELEMENT SYSTEMATICS WITH APPLICATION TO ^{26}Al AND SELECTED NUCLEI OF IMPORTANCE TO THE SUPERNOVA PROBLEM	*George M. Fuller, William A. Fowler, and Michael J. Newman*	447	9-F1
RATES FOR SOME REACTIONS INVOLVING ^{42}Ca AND ^{44}Ca	*C. W. Cheng and J. D. King*	475	10-B1
THE AGES AND DISTANCES OF EIGHT GLOBULAR CLUSTERS	*Bruce W. Carney*	481	10-C2
RED GIANT MODEL ATMOSPHERES. I. A GRID OF OPACITY SAMPLED MODELS	*H. R. Johnson, A. P. Bernat, and B. M. Krupp*	501	10-E1

APRIL, Number 4

SPECTROPHOTOMETRY OF THE QUASARS IN THE CTIO 4 METER SURVEY . .	*Patrick Osmer*	523	11-A2
REVISED MK SPECTRAL TYPES FOR G, K, AND M STARS . .	*Philip C. Keenan and Ronald E. Pitts*	541	11-C1
A CATALOG OF MORPHOLOGICAL TYPES IN 55 RICH CLUSTERS OF GALAXIES	*Alan Dressler*	565	11-G1
FORBIDDEN LINES OF np^q IONS. I. DETAILED BALANCE AND LINE INTENSITY RATIOS	*Minas Kafatos and John P. Lynch*	611	12-D1
INDEX TO VOLUME 42		v	12-F13

THE ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES
INDEX TO VOLUME 42
1980 JANUARY, FEBRUARY, MARCH, AND APRIL

BACKER, D. C. Statistical Summaries of Polarized Pulsar Radiation. *D. C. Backer and Joanna M. Rankin.* **42,** 143, 3-F2

BERNAT, A. P. Red Giant Model Atmospheres. I. A Grid of Opacity Sampled Models. *H. R. Johnson, A. P. Bernat, and B. M. Krupp.* **42,** 501, 10-E1

BOKSENBERG, A. The Distribution of Lyman-Alpha Absorption Lines in the Spectra of Six QSOs: Evidence for an Intergalactic Origin. *Wallace L. W. Sargent, Peter J. Young, A. Boksenberg, and David Tytler.* **42,** 41, 1-G2

BORRA, ERMANNO F. The Magnetic Fields of the Ap Stars. *Ermanno F. Borra and J. D. Landstreet.* **42,** 421, 9-D1

BRAULT, JAMES W. The Titanium Oxide Φ System. *Daniel C. Galehouse, James W. Brault, and Sumner P. Davis.* **42,** 241, 6-C1

CARNEY, BRUCE W. The Ages and Distances of Eight Globular Clusters. *Bruce W. Carney.* **42,** 481, 10-C2

CHENG, C. W. Rates for Some Reactions Involving ^{42}Ca and ^{44}Ca. *C. W. Cheng and J. D. King.* **42,** 475, 10-B1

CODE, A. D. Ultraviolet Photometry from the *Orbiting Astronomical Observatory.* XXXVIII. A Second Atlas of Ultraviolet Spectra. *Marilyn R. Meade and A. D. Code.* **42,** 283, 6-G2

DAVIS, SUMNER P. The Titanium Oxide Φ System. *Daniel C. Galehouse, James W. Brault, and Sumner P. Davis.* **42,** 241, 6-C1

DRAKE, STEPHEN A. The Emission-Line Spectrum from a Slab of Hydrogen at Moderate to High Densities. *Stephen A. Drake and Roger K. Ulrich.* **42,** 351, 7-F1

DRESSLER, ALAN. A Catalog of Morphological Types in 55 Rich Clusters of Galaxies. *Alan Dressler.* **42,** 565, 11-G1

FOWLER, WILLIAM A. Stellar Weak-Interaction Rates for *sd*-Shell Nuclei. I. Nuclear Matrix Element Systematics with Application to ^{26}Al and Selected Nuclei of Importance to the Supernova Problem. *George M. Fuller, William A. Fowler, and Michael J. Newman.* **42,** 447, 9-F1

FULLER, GEORGE M. Stellar Weak-Interaction Rates for *sd*-Shell Nuclei. I. Nuclear Matrix Element Systematics with Application to ^{26}Al and Selected Nuclei of Importance to the Supernova Problem. *George M. Fuller, William A. Fowler, and Michael J. Newman.* **42,** 447, 9-F1

GALEHOUSE, DANIEL C. The Titanium Oxide Φ System. *Daniel C. Galehouse, James W. Brault, and Sumner P. Davis.* **42,** 241, 6-C1

GREEN, SHELDON. Collisional Excitation of Interstellar Molecules: Water. *Sheldon Green.* **42,** 103, 2-G1

HAYNES, M. P. Bright Galaxies in Nearby Abell Clusters. *M. P. Haynes.* **42,** 83, 2-D2

JACOBY, GEORGE H. The Luminosity Function for Planetary Nebulae and the Number of Planetary Nebulae in Local Group Galaxies. *George H. Jacoby.* **42,** 1, 1-A2

JOHNSON, H. R. Red Giant Model Atmospheres. I. A Grid of Opacity Sampled Models. *H. R. Johnson, A. P. Bernat, and B. M. Krupp.* **42,** 501, 10-E1

JONES, HARRISON P. The Physical Effects of Radiative Transfer in Multidimensional Media Including Models of the Solar Atmosphere. *Harrison P. Jones and Andrew Skumanich.* **42,** 221, 6-A2

KAFATOS, MINAS. Forbidden Lines of np^q Ions. I. Detailed Balance and Line Intensity Ratios. *Minas Kafatos and John P. Lynch.* **42,** 611, 12-D1

KEENAN, PHILIPS C. Revised MK Spectral Types for G, K, and M Stars. *Philip C. Keenan and Ronald E. Pitts.* **42,** 541, 11-C1

KING, J. D. Rates for Some Reactions Involving ^{42}Ca and ^{44}Ca. *C. W. Cheng and J. D. King.* **42,** 475, 10-B1

KRUPP, B. M. Red Giant Model Atmospheres. I. A Grid of Opacity Sampled Models. *H. R. Johnson, A. P. Bernat, and B. M. Krupp.* **42,** 501, 10-E1

LANDSTREET, J. D. The Magnetic Fields of the Ap Stars. *Ermanno F. Borra and J. D. Landstreet.* **42,** 421, 9-D1

LYNCH, JOHN P. Forbidden Lines of np^q Ions. I. Detailed Balance and Line Intensity Ratios. *Minas Kafatos and John P. Lynch.* **42,** 611, 12-D1

MEADE, MARILYN R. Ultraviolet Photometry from the *Orbiting Astronomical Observatory.* XXXVIII. A Second Atlas of Ultraviolet Spectra. *Marilyn R. Meade and A. D. Code.* **42,** 283, 6-G2

MURPHY, MARTIN J. The Equation of State near β Equilibrium for a Collapsing Stellar Core. *Martin J. Murphy.* **42,** 385, 9-A2

NEWMAN, MICHAEL J. Stellar Weak-Interaction Rates for *sd*-Shell Nuclei. I. Nuclear Matrix Element Systematics with Application to ^{26}Al and Selected Nuclei of Importance to the Supernova Problem. *George M. Fuller, William A. Fowler, and Michael J. Newman.* **42,** 447, 9-F1

OSMER, PATRICK. Spectrophotometry of the Quasars in the CTIO 4 Meter Survey. *Patrick Osmer.* **42,**523, 11-A2

OSMER, PATRICK S. Discovery and Spectrophotometry of the Quasars in the $-40°$ Zone of the CTIO Curtis Schmidt Survey. *Patrick S. Osmer and Malcolm G. Smith.* **42,** 333, 7-D1

PITTS, RONALD E. Revised MK Spectral Types for G, K, and M Stars. *Philip C. Keenan and Ronald E. Pitts.* **42,** 541, 11-C1

RANKIN, JOANNA M. Statistical Summaries of Polarized Pulsar Radiation. *D. C. Backer and Joanna M. Rankin.* **42,** 143, 3-F2

ROGERSON, JOHN B., JR. The *Copernicus* Ultraviolet Spectral Atlas of Iota Herculis. *Walter L. Upson II and John B. Rogerson, Jr.* **42,** 175, 4-D1

SARGENT, WALLACE L. W. The Distribution of Lyman-Alpha Absorption Lines in the Spectra of Six QSOs: Evidence for an Intergalactic Origin. *Wallace L. W. Sargent, Peter J. Young, A. Boksenberg, and David Tytler.* **42,** 41, 1-G2

SKUMANICH, ANDREW. The Physical Effects of Radiative Transfer in Multidimensional Media Including Models of the Solar Atmosphere. *Harrison P. Jones and Andrew Skumanich.* **42,** 221, 6-A2

SMITH, MALCOLM G. Discovery and Spectrophotometry of the Quasars in the $-40°$ Zone of the CTIO Curtis Schmidt Survey. *Patrick S. Osmer and Malcolm G. Smith.* **42,** 333, 7-D1

SMITH, MYRON A. Nonradial *m*-Mode Changes in the 53 Persei Variable 22 Orionis. *Myron A. Smith.* **42,** 261, 6-E1

TYTLER, DAVID. The Distribution of Lyman-Alpha Absorption Lines in the Spectra of Six QSOs: Evidence for an Intergalactic Origin. *Wallace L. W. Sargent, Peter J. Young, A. Boksenberg, and David Tytler.* **42,** 1-G2

ULRICH, ROGER K. The Emission-Line Spectrum from a Slab of Hydrogen at Moderate to High Densities. *Stephen A. Drake and Roger K. Ulrich.* **42,** 351, 7-F1

UPSON, WALTER L., II. The *Copernicus* Ultraviolet Spectral Atlas of Iota Herculis. *Walter L. Upson II and John B. Rogerson, Jr.* **42,** 175, 4-D1

YOUNG, PETER J. The Distribution of Lyman-Alpha Absorption Lines in the Spectra of Six QSOs: Evidence for an Intergalactic Origin. *Wallace L. W. Sargent, Peter J. Young, A. Boksenberg, and David Tytler.* **42,** 41, 1-G2

ZINN, ROBERT. The Globular Cluster System of the Galaxy. I. The Metal Abundances and Reddenings of 79 Globular Clusters from Integrated Light Measurements. *Robert Zinn.* **42,** 19, 1-E1